



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/756,977

01/13/2004

Alan D. Kersey

CC-0700

3781

7590

08/01/2006

Robert D. Crawford
CiDRA Corporation
50 Barnes Park North
Wallingford, CT 06492

EXAMINER

LAU, TUNG S

ART UNIT

PAPER NUMBER

2863

DATE MAILED: 08/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/756,977

Applicant(s)

KERSEY ET AL.

Examiner

Tung S. Lau

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,11-21 and 27-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,11-15,17-21 and 27-46 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

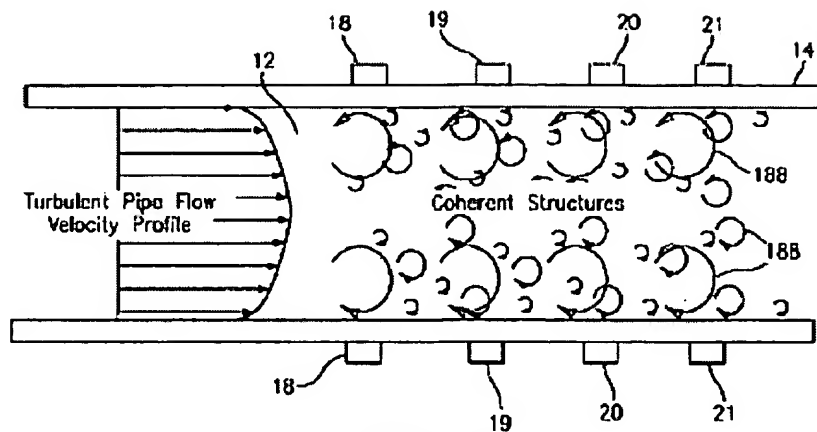
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

a. Claims 1, 11-15, 17, 19, 20, 28, 29, 30, 31, 32, 33, 34, 35, 36, 42, 21, 41, 43, 44, 45 and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Fernald et al. (U.S. Patent Application Publication 2004/0168523).

Regarding claim 1:

Fernald discloses a method for measuring the flow velocity of a fluid flowing through a conduit, the method comprising: providing an array of at least two ultrasonic sensors disposed at locations spaced along the length of the conduit in the direction of the flow (fig. 10, unit 82, 83, fig. 12, unit 115, 116, 117, 118) each ultrasonic sensor providing a respective sensors signal indicative of a parameter of an ultrasonic signal propagation through the fluid (page 2, section 0012-0014, fig. 12, unit 12, 150); processing the sensor signals to define a convective ridge in the k-w plane (page 10, section 0124); and determining the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid (page 10, section 0124, fig. 16).

**FIG. 2**

Regarding claim 11:

Fernald discloses an apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising: an array of at least two ultrasonic sensors unit disposed at locations spaced along the length of the conduit in the direction of the flow of the fluid (fig. 2, unit 18, -21, fig. 10, fig. 12, section 115, 116); each ultrasonic sensor providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; a processor that defines a convective ridge in the k-w plane in response to the sensor signals (page 10, section 0124), and determines the slope of at least a portion of the convective ridge to determine the flow velocity of the fluid (page 10, section 0124, fig. 16).

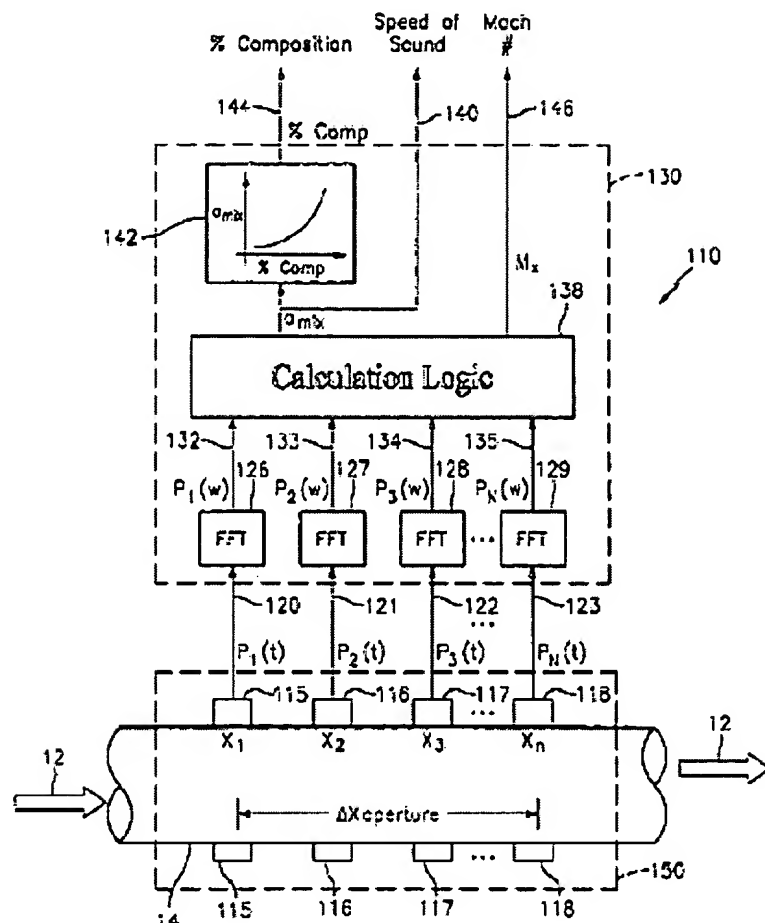


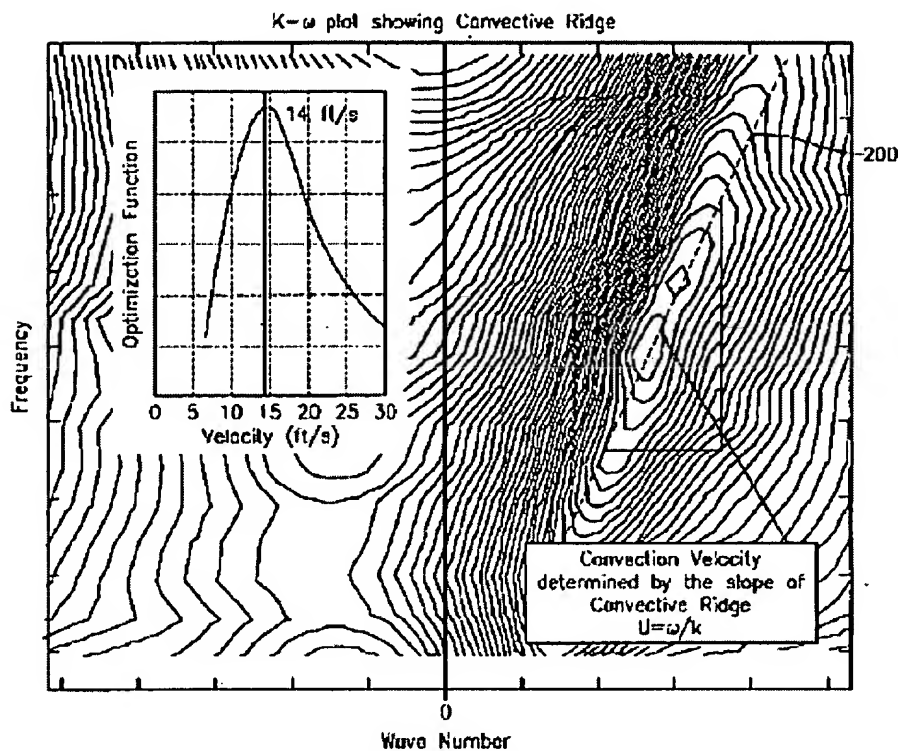
FIG. 12

Regarding claim 21:

Fernald discloses an apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising: an array of at least two ultrasonic sensors disposed at locations spaced along the length of the conduit in the direction of the flow of the fluid (fig. 2, unit 19-21, fig. 10, unit 83, 84, fig. 12, section 115, 116), each ultrasonic sensor providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid (page 2, section 0012-0014); means for processing the sensor signals to define a convective ridge in the k-w plane, and means for determining the slope of at least

Art Unit: 2863

a portion of the convective ridge to determine the flow velocity of the fluid (page 10, section 0124, fig. 16).

**FIG. 16**

Regarding claim 41:

Fernald discloses an apparatus for measuring the flow velocity of a fluid flowing through a conduit, the apparatus comprising: an array of at least three ultrasonic sensors disposed longitudinally at respective locations spaced along the length of the conduit in the direction of the flow of the fluid (fig. 2, unit 18-21, fig. 10, unit 83-84, fig. 12, section 115-118), each ultrasonic sensor providing a respective sensor signal indicative of a parameter of an ultrasonic signal propagating through the fluid; and a processor (fig. 12, unit 138, page 2, section

section 115, 116); and a processor (fig. 12, unit 138), in response to the sensor signals, that determines the flow velocity of the fluid (page 10, section 0124, fig. 16).

Regarding claim 44, wherein a processor uses an array processing algorithm to determine the flow velocity of the fluid (page 10, section 0124, fig. 16).

Regarding claim 12, Fernald further discloses the processor samples the sensor signals over a predetermined time period, accumulates the sampled sensor signals over a predetermined sampling period, and processes the sampled sensor signals to define the convective ridge in the k-w plane (page 5, section 0064, page 10, section 0124); Regarding claim 13, Fernald further discloses the processor further determines the orientation of the convective ridge in the k-w plane (fig. 16, page 10, section 0124); Regarding claim 14, Fernald further discloses the sensor signals are indicative of vortical disturbances with the fluid (fig. 2); Regarding claim 15, Fernald further discloses the processor uses a beam forming algorithm to define the convective ridge in the k-w plane (fig. 16); Regarding claim 17, Fernald further discloses the processor determines the slope of at least a portion of the convective ridge by approximating the convective ridge as a straight line (fig. 16); Regarding claim 19, Fernald further discloses determines the volumetric of the flow (page 4, section 0059); Regarding claim 20, Fernald further discloses sensor signal is transmit time to prolong through the fluid (page 9, section 0117); Regarding claim 28, Fernald

Art Unit: 2863

further discloses pulse-echo configuration (fig. 15, unit 180, 182); Regarding claim 29, Fernald further discloses at least 3 sensors (fig. 15, unit 180, 182, 184); Regarding claim 30, Fernald further discloses amplitude of the signal (fig. 16); Regarding claim 31, Fernald further discloses sensors are clamped onto an outer surface of the conduit (abstract); Regarding claim 32, Fernald further discloses sensors are attached to the conduit (abstract); Regarding claim 33, Fernald further discloses sensor are contact with fluid (abstract); Regarding claim 34, Fernald further discloses fluid is single phase (abstract ,fig. 2); Regarding claim 35, Fernald further discloses fluid is multiphase (abstract ,fig. 2); Regarding claim 36, Fernald further discloses multiphase included liquid and gas (abstract); Regarding claim 42, Fernald further discloses the processor uses an array processing algorithm (fig. 12, unit 138); Regarding claims 45 and 46, Fernald further discloses at least two ultrasonic sensors (fig. 15, unit 180-186);

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

a. Claims 18, 37, 38, 27, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fernald et al. (U.S. Patent Application Publication

Art Unit: 2863

2004/0168523) in view of Lynnworth (U.S. Patent Application Publication 2004/0011141).

Regarding claim 18, Fernald further discloses each ultrasonic sensor includes an ultrasonic receiver which are disposed such that the ultrasonic signal propagating there between is orthogonal to the direction of the fluid flow (page 3, section 0042, fig. 12, unit 115-118, abstract); Regarding claim 37, Fernald further discloses included receiver (page 3, unit 0034); Regarding claim 38, Fernald further discloses the ultrasonic receiver of each ultrasonic sensor are disposed opposing each other such that the ultrasonic signal propagates through the fluid substantially orthogonal to the direction of the fluid flow (fig. 12, unit 115, 116, 117, 118); Regarding claim 27, Fernald further discloses sensors are disposed in pitch-catch configuration and receiver are mounted opposing each other (fig. 12, unit 115, 116); Regarding claim 39, Fernald further discloses each ultrasonic sensor includes an ultrasonic unit having an ultrasonic receiver (page 3, unit 0034, fig. 12, 115); Regarding claim 40, Fernald further discloses ultrasonic signal that propagates through the fluid substantially orthogonal to the direction of the fluid flow, which reflects back substantially orthogonal to the direction of the fluid flow to the receiver of each ultrasonic unit (fig. 2, unit 18, fig. 12, unit 115, fig. 2, unit 12);

Fernald discloses not discloses the ultrasonic transmitter, Lynnworth discloses the ultrasonic transmitter (page 2, section 0021), in order to have a very accurate result (page 1, section 0009).

Art Unit: 2863

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fernald to have the ultrasonic transmitter taught by Lynnworth, in order to have a very accurate result (page 1, section 0009).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Fernald and Lynnworth are analogous art because they are from the same field of endeavor, detecting mass flow rate in a conduit.

Allowable Subject Matter

3. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitation of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: prior art fail to teach the beam forming algorithm includes one of a Capon algorithm and a MUSIC algorithm.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

4. Applicant's arguments with respect to the amended claims have been considered, however, applicant's arguments filed 07/13/2006 have been fully considered but they are not persuasive.

A. Applicant argues that the prior art fail to teach and teaches away from the use of ultrasonic sensor, the reason being that Fernald uses pressure sensor (applicant argument page 8, lines 15-23).

Reminds to the applicants that Fernald not only uses pressure sensor to sense pressure, but also use to sense acoustic signature of the fluid (abstract, page 1, section 0002, page 2, section 0033, page 3, section 0034-0038), not only Fernald can detect acoustic sound but can also detect speed of sound and Mach number (page 2, section 0033, page 3, section 0034-38). Reminds to the applicants that during patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification." Applicant always has the opportunity to amend the claims during prosecution, and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 415 F.2d 1393, 1404-05,

Art Unit: 2863

162 USPQ 541, 550-51 (CCPA 1969). While the meaning of claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allowed. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). USPTO personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997).

According to Merriam-Webster online dictionary (see attachment), acoustic means of relating to the science of sound. Ordinary skill in the art at the time of the invention would know this sound can include any sound, including ultrasound, therefore Fernald discloses the use of ultrasonic sensor.

As regards to teach away in 102 prior art rejection. Arguments that the alleged anticipatory prior art is nonanalogous art' or teaches away the invention' or is not recognized as solving the problem solved by the claimed invention, [are] not germane 'to a rejection under section 102'. Twin Disc, Inc. v. United States, 231 USPQ 417, 424 (Cl. Ct. 1986) (quoting In re Self, 671 F.2d 1344, 213 USPQ 1, 7 (CCPA 1982)). See also State Contracting & Eng'g Corp. V. Condotte America, Inc, 346 F.3d 1057, 1068, 68 USPQ2d 1481, 1488 (Fed. Cir. 2003). (The

question of whether a reference is analogous art is not relevant to whether that reference anticipates. A reference may be directed to an entirely different problem than the one addressed by the inventor, or may be from an entirely different field of endeavor than that of the claimed invention, yet the reference is still anticipatory if it explicitly or inherently discloses every limitation recited in the claims.)

B. Applicant continues to argue that the prior art fail to disclose an array of at least three ultrasonic sensors disposed at location spaced along the length of the conduit of the flow of the fluid (applicant argument page 9, lines 9-15).

Fernald clearly discloses an array of at least three ultrasonic sensors disposed at location spaced along the length of the conduit of the flow of the fluid in fig. 2, unit 18-21, fig. 10, unit 82, 83, 84, fig. 12, unit 115-118.

C. Applicant continues to argue that the prior art fail to disclose substantially orthogonal to the direction to the fluid (applicant argument page 10, lines 1-9).

Fernald clearly discloses substantially orthogonal to the direction to the fluid in fig. 2, unit 18-21, where the flow of the fluid is in vortex to the sensors.

D. Applicant continues to argue that Lynnworth fail to disclose an array processing algorithm to determine the flow velocity of the fluid (applicant argument page 10-11, lines 28-2).

Reminds the applicants that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

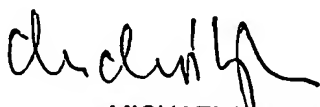
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung S Lau whose telephone number is 571-272-2274. The examiner can normally be reached on M-F 9-5:30. If attempts to

Art Unit: 2863

reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 571-272-2269. The fax phone numbers for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TL


MICHAEL NGHIEM
PRIMARY EXAMINER